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the fact that almost all of the recent writers upon the topic have freed themselves from the uncritical conceptions that Fechner introduced, and agree in the main upon a general end which the establishment of a psychophysics has in view. J. J.

Die Deutung der psychophysischen Gesetze. AD. ELSAS. Philosophische Monatshefte, XXIV, 3 und 4, 1887.

This article forms part of a controversy regarding the fundamental validity and import of the psychophysic law, which has been raging since the appearance of Fechner's first work in this field, and had busied the founder of psychophysics up to the day of his death. It will hardly be feasible to recount here the many and detailed issues which the author takes with Fechner's theories, but a brief notice of their general features is in place, especially as the attack is directed against the most fundamental parts of Fechner's work, and in fact, if accepted, as it promises to be, will be so entirely subversive of much of Fechner's mathematical deductions that Dr. Elsas acknowledges his trepidation in taking so bold a position. Fechner uses mathematical principles, says the author, not as tools, but as a magic wand by which what is not contained in the facts can be brought out of them, neglecting to remember that mathematical aids can only simplify and arrange what is implicit in the facts as ordinarily stated. Fechner passes from Weber's law, which simply states the dependence of the perceptibility of a difference between sensations upon the ratio of the stimuli that gave rise to them, to the logarithmic form of the law by aid of a comprehensive mathematical theorem ("Hilfs-princip"). Dr. Elsas shows conclusively that this principle is unnecessary, and that its agreement with fact in the application of it made by Fechner must be regarded as accidental. Again, Fechner's deductions start with the assumption that sensations can be summated; this the author refuses to accept, and points to the sensations of tone intervals, in which the summation does not give the effect of the resulting interval, but it requires the product to do so. Once more, the "relational hypothesis," as Fechner terms his exposition of the law, is only one of a number of possible hypotheses that fit the facts quite as well as does Fechner's, and the decisive ground of choice between them depends on considerations of naturalness which Fechner hardly touches upon. Fechner sees in the fact that his formulae take into account the existence of the threshold a valuable proof of their validity; Dr. Elsas shows that other formulae have the same merit, and that the threshold is made mechanically necessary by the physiological adaptations of the organism. In fine, the author holds that Fechner's mathematical deductions are irrelevant, that they lead to a false view of the entire field of psychophysics, and that they neglect to consider the natural, physiological import of the facts which it is the aim of that science to coordinate and systematize.

J. J.

Die Willenshandlung: ein Beitrag zur physiologischen Psychologie. HUGO MÜNSTERBERG. Freiburg, I. B., 1888, 163 pp.

In his preface the author tells us that his first plan in writing a work on the Will was to prepare a general treatise, setting forth in the first part the physiology and pathology of the neuro-muscular system, whose function it is to conduct voluntary movements; in the second, to present the psychology of the will and make connec-

tion with the historic theoretical solutions of the problem; and in the third part, to propound his own theory of the will and indicate the relations of the topic to science and philosophy in general. For various reasons he abandoned this design and decided to publish the present contribution, containing an outline of his own theoretical views. The work reveals this origin in a disjointedness of some of its portions that makes it difficult to read and still more so to résumé.

In the introduction he explains that it is not his object to enter into metaphysical considerations, but to attempt to bring into harmony the various physiological and psychological facts of voluntary action. This he does under three heads. The first section treats of the "voluntary action as a motor process," and carries out with great suggestiveness the view that all action is at bottom of the type of a simple reflex act of greater or less complexity. The difference in complexity is of course enormous, especially so when the reaction follows only after a long interval and indirectly, but the fact that all acts find a place in the scale that begins in the simplest contraction is to him the important one. Closely connected with this point is the prominence of the evolutionary doctrine throughout his treatise. A sensori-motor mechanism is the result of an adaptation to the environment by evolution; the less completely adapted mechanisms failing to survive. This conception of all action as a useful reaction upon the stimulus furnished by the environment is carried all the way up, even to acts where the social factor is uppermost, where action becomes conduct, and forms one of the most interesting portions of the work. "The voluntary action as a phenomenon of consciousness" is the title of the second section of the work. It consists in the main of an analysis of the factors in a voluntary act, bringing to the front the "innervation feeling." This feeling is the important point, and when it is anticipatory the act that arouses it becomes voluntary. An act cannot be voluntary the first time it is performed; to learn how to perform a new combination of movements we must get the feeling of the accomplished result. The third section ("the voluntary action as a conscious motion") considers the various theories of voluntary motion, especially such as are based upon physiological experimentation, and criticises their weaknesses. His own interpretation of the voluntary process is founded upon the sensori-motor nature of all action. No brain-centre can be motor alone or sensory alone, but both at once. The various parts of the brain serve the purposes of various kinds of sensori-motor reactions, differing not only in complexity, but in the nature of their associations.

Dr. Münsterberg's treatment of the will coincides in many points with that recently sketched in an essay by Prof. William James, and it is important not only as a convenient compend of an interesting theoretical chapter of physiological psychology, but also because it suggests leading lines of thought by which the results of experimentation are to be interpreted.

J. J.

Ueber das Geruchsvermögen der Krebse. Inaug. Dis. K. MAY. Kiel, 1887.

This is a painstaking attempt to determine the anatomy of the olfactory "hairs" of the crab, the chemical composition of their viscus content, and their physiology, by a pupil of Professor Hensen, whose work on auditory hairs has been so fruitful. His conclusions are that the neural content of these hairs near the end of the anten-